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CENTRAL INTELLIGENCE AGENCY

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orders issued by the Soviets on handling of the type AK 16 steel to be used in the armor plating of the bridge of the coal/ore freighters being built at Warnemuende. (4 pages)

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EAST GERMANYNAVAL/ECONOMIC

Instructions issued by the Russians for the handling of the steel type AK 16 to be used in the armour plating of the bridge of the coal-ore freighters being constructed at WARNEMUENDE (12 Feb 1957)

two orders issued by the Russians as to how work on the armour-plating of the bridge of the coal-ore freighter should be carried out.

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PREPARATION OF STEEL TYPE AK 16 for the BRIDGE of COAL-ORE FREIGHTERS.A. Preparation of material:

1. The cutting out of the steel plates is to be carried out using an oxy-acetylene cutter. Cutting must only be carried out at temperatures above 0° Centigrade. The places where oxy-acetylene cutting is carried out must be protected from draught and precipitation. Before cutting, the steel plate must be cleaned on both sides in the area of the intended cut and made free from oil, paint, scaling or any other impure matter.
2. All cutting must be done standardly using a machine operated cutter. Cutting by hand is only allowed for cutting areas which cannot be reached by machine. The speed for hand-cutting must be maintained at 500 mm/min at 3.5 atmospheres absolute of oxygen pressure. When cutting, the oxygen must be 99% pure. The quoted figures are related to oxy-acetylene cutting.
3. Before cutting commences, the heart of the flame when burning normally must be set to have sharply outlined edges. It is forbidden to work with an excess of oxy-acetylene. Cutting must be done evenly. When breaking off in the middle of a cut the cut must be carried on to a part of the metal which is not going to be used. The interruption of cutting whilst on a curve is not permitted. Particular care must be given to the cleanliness of the cut as streaks and cuts form a good basis for later cracks. Waste must only be cleared away after everything has completely cooled. After the waste has been cleared away, all rough edges must be levelled and corners rounded off ($r = 2.5$ to 3 mm).
4. After levelling, the edges must be carefully inspected to ensure that no cracks or other faults exist. Any faults found must be removed by grinding and must then be welded up using rods of the type YOUN-13/55 or YOUN-13/45A. The areas welded up must then be ground down to the required measurements using a polishing disc.
5. Adjustment to parts or plates is to be done when necessary using 3 or 7 roller-beds. The sheets are to be cold and not pre-warmed. (It will be presumed that the plates will be delivered in an already pre-warmed state.)

Note: Adjustment to the plates after welding can also be done when necessary with the plates in a cold condition.

B. Preparation of parts for fitting and fitting together for welding:

1. All parts which are to be fitted together must be cleaned at the area for the welding seams and on the surface of the plates to a minimum of 15 mm from the edges. Cleaning of these areas must be done right down to the bare metal to ensure that rust, paint, oil, scaling and other dirt is completely removed. The cleanliness of the surfaces will be inspected immediately before welding commences and if necessary they must be recleaned.

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2. The welding cracks must correspond to "GOST 5264-50". The cracks, which differ with the shipyards, must be corrected. Subsequent work on corrections must be carried out by grinding or chipping. 25X1
3. The making fast of parts to be welded must be done by bolting, ballast-loading and other means which will not hinder the welding and will allow a free shrinking of the seam. Such equipment can be used at the same time to prevent distortions during welding. The number of places where bolting and other equipment is used must be kept as low as possible. The fastenings used at the time must only be removed by chipping away the seams followed by grinding. The removal of parts welded on by using a sledge-hammer or oxy-acetylene cutter is strictly forbidden. The length of a tack-weld must be 40-60 mm. Torn tacking points must be corrected by chipping.
4. The plates must be laid out on assembly-plate with a crack from 2-0.5 mm and must then be joined by tacking. At each side of the butt-joint and at a distance of 200 mm from the joint, weights must be laid on the plates to prevent distortion during welding. These weights may only be removed after the seam has completely cooled.
5. Fitting together will take place in the following order:
- (a) Fitting together and welding of the surfaces;
 - (b) welding-on of brackets and structures;
 - (c) cutting out of openings.
- C. Welding-on of structures:
- 1. The welding-on of structures to the surfaces will only take place after the welding together of the surfaces has been fully completed.
 - 2. The netting for the structures will be marked out on the laid-out surfaces, the structures set up, arranged and then made fast by tacking-welds.
 - 3. In the case of one-sided seams, the tacking-welds are to be put on the opposite side.
 - 4. Before the structures are welded on, weights must be laid on to prevent distortion. The weights must be placed at a distance of 200 mm from the brackets on both sides of same or on the brackets. The weights may only be removed after the seams have completely cooled.
- D. Burning out of openings:
- 1. The openings will be cut-out after the surfaces have been welded together and the structures have been welded on.
 - 2. The oxy-acetylene cutting must conform to the points laid out under paras A1 - 5.
- E. Fitting together of the deck-house:
- 1. The deck-house will be built together from completed surfaces either on the deck or on a special floor using tacking-welds 50 mm in length.

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2. Whilst the deck-house is being built together and before it is welded, stays will be fitted between the walls of the house and also between the deck of the house and the ship's deck. This is to prevent welding distortion in the walls, decks and surrounding area. The stays may only be removed after all seams have completely cooled. The stays will be fitted to a plan made by the technical department.

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3. Whilst stays are being fitted, the window-openings and especially the door-openings must be reinforced. To this end a rigid frame will be set into the door and window opening. These frames will be made fast to the surround of the openings by means of screw-clamps. From each rigid frame to the opposite wall a stay must be welded on by using a rod of the type YOHN 13/55 or YOHN 13/45A.
4. Stays will be removed by chipping and the points of welding will be levelled using a grinding machine. It is strictly forbidden to remove the stays by oxy-acetylene cutting.

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F. Inspection control:

The above points must all be controlled before welding. Such control and checking will be noted in a special book. These instructions for work apply in conjunction with the Production Technology 024/1 for coal-ore freighters and strict compliance must be given.

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WELDING-UP of STEEL TYPE AK 16 on the BRIDGE and COMPASS BRIDGE of COAL-ORE FREIGHTERS.

1. The preparation of the welding-seam must be in accordance with the regulations "GOST-VORSCHRIFTEN 5264-50". Welding-cracks which differ from the set standards must be corrected. This may only be done by grinding and chipping.
2. The welding-on of all necessary fastenings to plates of AK 16 may only be carried out using the type of electrodes which have been passed by the board and have been delivered from RUSSIA. The types are YOHN 13/55 and YOHN 13/45A.
3. The length of tacking-welds must be 40-60 mm.
4. Tacking-welds must not be positioned where welding seams cross or near openings.
5. For the welding of AK 16, only welders will be used who have passed a test suitable to the official norm.
6. For control of the welding the welding machines must be fitted with amperemeters. The correctness of these amperemeters must be tested once per month.
7. Group-amperemeters may be used which enable the strength of current of each welding-machine to be checked without the welder having to stop work. If in any workshop not enough amperemeters are available, then it is permissible to test the strength of current using a transportable amperemeter.
8. Welding a piece of AK 16 steel is not allowed if the room temperature is below 0°C. If the temperature of the parts is below 0°C, welding may only be carried out after pre-warming of the parts to a temperature of not more than 40°C. It is recommended that pre-warming is done by inductors.
9. Places where welding is carried out must be protected from draught and precipitation.
10. Welding with electrodes type YOHN 13/45A or YOHN 13/55 is to be carried out with a short arc using direct current and reversing polarity.

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11. (a) Strength of current in amperes during welding:

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<u>Type of Electrode</u>	<u>Diameter of electrode in mm.</u>	<u>Position of welding</u>		
		<u>Normal</u>	<u>Vertical and horizontal.</u>	<u>Overhead</u>
YOHN 13/55	3	100-130	90-120	90-120
or	4	160-210	130-160	130-160
YOHN 13/45A	5	220-280	160-210	-

- (b) The checking of the strength of current used by each welder must be done at least once during a shift by a supervisor of the quality control. Differences must be noted in a special book kept by the quality control.
12. Residual craters must be carefully welded to. It is forbidden to beat-out residual craters on the basic metal.
13. Seams will be done in narrow beads with a maximum diameter by normal and overhead welding of 2 electrode widths and by vertical and horizontal welding a maximum diameter of 3 electrode widths.
14. (a) Seams of over 0.5 m are to be step-back welded. The length of the steps will depend upon the electrode used.
- (b) After completion of each position, the area must be cleaned of all sediment and spray.
- (c) The welding of each seam will be carried out without a break until completed.
- (d) After completion of the seam the welder must place his stamp at the end of the seam.
15. During fitting together of the deck-house and before welding commences, stays will be fitted between the walls of the house and between roof and deck to prevent distortion. When building-in the stays, the door and window openings must be reinforced. To this end a rigid frame will be fitted which is made fast by screw clamps to the surrounding edges. Stays will be removed when all seams are cool. Removal will be done by chipping. Welded areas will be levelled using a grinder.
16. It is strictly forbidden to remove stays by oxy-acetylene cutting. During welding of the deck-house only electrodes must be used which conform strictly to para 10 of this instruction. The order of the welding together of the deck-house can be seen in the welding routine plan SW 1720.001.

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